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Lung Proteinase: Antiproteinase Balance and the Effect of Cigarette Smoke on this Interaction.

The twin objectives of this investigation are (1) to identify and quantitate the primary factor responsible for protecting the lung against the action of autogenous proteinases which have been previously shown in the investigator's laboratory to produce experimental emphysema in dogs; and (2) to examine the role of cigarette smoke on this interaction. The researchers shall isolate, purify, characterize, and quantitate the normally occurring substance found in lung tissue which inhibits the activity of specific proteolytic enzymes, and determine if this lung antiproteinase found in dogs has its counterpart in the human lung. The production of antiproteinases and their ability to interact with enzymes capable of inducing experimental emphysema in animals will be studied and evaluated in normal animals and those exposed to cigarette smoke.

The investigator's working hypothesis is that emphysema may be induced by the proteolytic activity of specific enzymes from polymorphonuclear leukocytes and/or pulmonary macrophages. The release of these enzymes may be stimulated by various airborne pollutants. These enzymes overwhelm the local defense mechanisms in the lung, including such factors as serum and tissue antiproteinases, and destroy or alter the elastic tissue of the alveoli.

Activation Date: May 1, 1974

Current Grant Level: \$38,163.

1005075514